IN THE CLAIMS

What is claimed is:

1. A measuring apparatus, comprising:

a light source for producing light beams for at least two optical channels; and

said optical channels each including:

an interferometer for receiving one said light beam and providing therefrom a reference beam and a measurement beam;

a reflective target for receiving and redirecting said measurement beam;

a beam splitter for receiving the redirected said measurement beam and providing therefrom a first portion and a second portion;

a detector for sensing said first portion and producing a detector signal based thereon;

said interferometer further for receiving said second portion of said measurement beam and combining said second portion with said reference beam to form a result beam; and

a receiver for sensing said result beam and producing a receiver signal based thereon.

2. The measuring apparatus of claim 1, wherein said light source includes a laser diode.

3. The measuring apparatus of claim 1, wherein said light source includes a single light producing unit, a splitter and a bender for producing said light beams.

4. The measuring apparatus of claim 1, wherein said light source includes a plurality of light producing units, one per each said optical channel.

5. The measuring apparatus of claim 1, wherein said interferometers and said beam splitters employ polarization.

6. The measuring apparatus of claim 1, wherein said reflective targets are retroreflectors.

7. The measuring apparatus of claim 1, wherein said detectors are position sensitive detectors.

8. The measuring apparatus of claim 1, wherein said detectors include at least on member of the set consisting of bi-cell photo diode units, quad-cell photo diode units, and photo diode arrays.

9. The measuring apparatus of claim 1, wherein said receivers include photo diodes.

10. The measuring apparatus of claim 1, further comprising:
a processing system for processing said detector signals and said receiver signals into position data suitable for communication to an external system.

11. The measuring apparatus of claim 10, wherein:
said light source includes a modulator to produce said light beams including a modulation characteristic; and
said processing system includes a demodulator and processes at least one of said detector signals and said receiver signals with phase sensitive detection.

12. A measuring apparatus, comprising:
means for producing light beams for at least two optical channels; and
said optical channels each including:
interferometer means for receiving one said light beam and providing therefrom a reference beam and a measurement beam;
means for receiving and redirecting said measurement beam;
splitter means for receiving the redirected said measurement beam and providing therefrom a first portion and a second portion;
detector means for sensing said first portion and producing a detector signal based thereon;
said interferometer means further for receiving said second portion of said measurement beam and combining said second portion with said reference beam to form a result beam; and

receiver means for sensing said result beam and producing a receiver signal based thereon.

13. The measuring apparatus of claim 12, wherein:
said means for producing light beams includes:
means for producing an initial beam;
means for splitting said initial beam into a first beam and at least one secondary beam; and
bender means for directing said secondary beams in parallel with said first beam, thereby producing said light beams for said at least two optical channels.

14. The measuring apparatus of claim 12, wherein:
said interferometers include means for polarizing said measurement beams; and
said splitter means includes means for separating with polarization, thereby permitting providing said first portions and said second portions of said measurement beams based on respective polarization characteristics.

15. The measuring apparatus of claim 12, further comprising:
processing means for processing said detector signals and said receiver signals into position data suitable for communication to an external system.

16. The measuring apparatus of claim 10, wherein:
said means for producing light beams includes modulating to produce said light beams including a modulation characteristic; and
said processing means includes demodulating means to permit processing at least one of said detector signals and said receiver signals with phase sensitive detection.

17. A method for measuring positional information about a target, the method comprising the steps of:
(a) producing light beams for at least two optical channels; and
in each said optical channel:

(b) receiving a said light beam and providing therefrom a reference beam and a measurement beam;

(c) receiving at and redirecting said measurement beam from the target;

(d) receiving the redirected said measurement beam and providing therefrom a first portion and a second portion;

(e) producing a detector signal based on said first portion;

(f) combining said second portion with said reference beam to form a result beam;

(g) producing a receiver signal based on said result beam; and

(h) processing said detector signals and said receiver signals into position data suitable for communication to an external system.

18. The method of claim 17, wherein:

said step (b) includes polarizing said measurement beams; and

said step (d) includes separating said first portions from said second portions based on polarization.

19. The method of claim 18, wherein:

said step (a) includes modulating with a frequency said light beams; and

said step (h) includes demodulating at least one of said detector signals and said receiver signals based on said frequency.

20. The method of claim 19, wherein said step (h) includes processing with phase sensitive detection.